DEFENSE INFORMATION SYSTEMS AGENCY
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IN REPLY
REFER TO: Joint Interoperability Test Command (JTE)   **1 Jun 12**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Analog Interface

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (e), see Enclosure 1

1. References (a) and (b) establish Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.

2. The Cisco Unity Connection Release 8.6(1) with PIMG Analog interface is hereinafter referred to as the System Under Test (SUT). The SUT met all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Information Systems Network (DISN) as a Customer Premise Equipment (CPE) voicemail system with the Avaya Communication Server (CS) 2100. The SUT met the critical interoperability requirements set forth in Reference (c) using test procedures derived from Reference (d). Per Reference (c), Internet Protocol (IP) Version 6 (IPv6) is conditional; the SUT does not support IPv6. Additionally, JITC analysis also determined that any digital switching system on the Unified Capabilities (UC) Approved Product List (APL) that has a certified serial Electronic Industries Alliance-232 Simple Message Desk Interface and 2-wire loop start analog interface should function identically and are also certified for joint use within the DISN. No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that could affect interoperability, but no later than three years from the date of the UC APL memorandum.

3. This finding is based on interoperability testing, review of the vendor's Letters of Compliance (LoC), and DISA Certifying Authority (CA) Recommendation. Interoperability testing was conducted at JITC's Global Information Grid Network Test Facility, Fort Huachuca, Arizona from 5 through 15 July 2011. Review of the vendor's LoC was completed on 13 February 2012. The DISA CA provided a positive DISA CA Recommendation on 30 May 2012 based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (e). Enclosure 2 documents the test results and describes the tested network and system configurations.

JITC Memo, JTE, Special Interoperability Test Certification of the Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Analog Interface

4. The Capability Requirements (CR) and Functional Requirements (FR) used to evaluate the interoperability of the SUT and the interoperability statuses are indicated in Table 1. This interoperability test status is based on the SUT's ability to meet CPE voicemail system requirements specified in section 5 of Reference (c) verified through JITC testing and/or vendor submission of LoC.

Table 1. SUT CR, FR and Interoperability Status

Interface	Critical	Certified	CRs/FRs	Met	UCR Paragraph
EIA-232 Serial	No	Yes	ANSI/TIA/EIA-232-F (C)	Met	5.2.1.2
			FCC Part15/Part 68 (R)	Met	5.2.1.2
2-Wire Analog (GR-506-CORE)	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.1.2
			DTMF and/or DP out pulsing IAW GR-506-CORE (C)	Met	5.2.1.2
			ROUTINE precedence only IAW UCR, Section 5.3.2.31.3 (R)	Met	5.2.1.2
			TIA/EIA-470-B (R)	Met	5.2.1.2
IP (1000BaseT) (IEEE 802.3u)	No	Yes	Service Class Tagging (R)	Met	5.3.3.3.2
			IEEE 802.3 (C)	Met	5.2.1.2
Security	Yes	Yes	Security (R)(see note)	Met	5.4

NOTE: Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

LEGEND:
1000BaseT	1000 Mbps (Baseband Operation, Twisted Pair) Ethernet	FCC	Federal Communications Commission
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	FR	Functional Requirement
		GR	Generic Requirement
		GR-506	LSSGR: Signaling for Analog Interfaces
ANSI	American National Standards Institute	IAW	In accordance with
C	Conditional	IEEE	Institute of Electrical and Electronics Engineers
CR	Capability Requirement	IP	Internet Protocol
DCE	Data Circuit-terminating Equipment	LATA	Local Access and Transport Area
DISA	Defense Information Systems Agency	LSSGR	LATA Switching Systems Generic Requirements
DP	Dial Pulse	Mbps	Megabits per second
DTE	Data Terminal Equipment	R	Required
DTMF	Dual Tone Multi-Frequency	SUT	System Under Test
EIA	Electronic Industries Alliance	TIA	Telecommunications Industry Association
EIA-232-F	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	TIA/EIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
		UCR	Unified Capabilities Requirements

5. No detailed test report was developed in accordance with (IAW) the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government

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civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

6. The JITC point of contact is Mr. Edward Mellon, DSN 879-5159, commercial (520) 538-5159, FAX DSN 879-4347, or e-mail to edward.mellon@disa.mil. JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1109802.

FOR THE COMMANDER:

2 Enclosures a/s   for RICHARD A. MEADOR
                                                     Chief
                                                     Battlespace Communications

Distribution (electronic mail):
Joint Staff J-6
Joint Interoperability Test Command, Liaison, TE3/JT1
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Office of Assistant Secretary of Defense (NII)/DOD CIO
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     Division, J68
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

(c)   Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008, Change 2," December 2010.

(d)   Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

(e)   Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Cisco Unity Connection Release (Rel.) 8.6 with (w)/ Private Branch Exchange Internet Protocol Media Gateway-Analog (PIMG-A) 6.0 Service Update (SU) 8 (Tracking Number 1109802)," Draft

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Analog Interface is hereinafter referred to as the System Under Test (SUT).

2. SPONSOR. Missile Defense Agency (MDA)

3. SYSTEM POC. Mr. Steve Pursell, USAISEC Technology Integration Center (TIC) US Army, Bldg 53302, e-mail: steve.pursell@us.army.mil.

4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a Voice Messaging System that offers unified messaging capabilities through integration with Microsoft Exchange, integrated messaging using Cisco ViewMail for Microsoft Outlook running on Windows XP, Windows Vista, and Windows 7, and Voice Message services to Certified Defense Information Systems Network (DISN) equipment using two-wire analog loop start lines via the PIMG. The SUT is for use with the switching systems within this certification over the tested interfaces using the Cisco Unity Connection Software Version 8.6(1). With the Cisco Unified Computing System, applications run in a virtualized environment comprised of VMware software and Cisco Unified Computing System servers. JITC analysis determined that multiple hardware configurations should functional identically to the SUT and they are also certified for joint use. These hardware configurations can be found by selecting the "Cisco Unified Communications on the Cisco Unified Computing System" link at the following URL: www.cisco.com/go/swonly. The SUT utilizes a web-based interface to maintain the necessary information needed to provide messaging services to authorized mailbox owners as well as system maintenance which includes mailbox associations, system and messaging service settings, maintenance and diagnostics. Management of the SUT is though a site-provided, Secure Technical Implementation Guide-compliant workstation. Although redundancy is not tested or required for Customer Premise Equipment (CPE), the SUT supports a two-server active/active cluster within a site's Local Area Network (LAN) to provide high availability and redundancy.

6. OPERATIONAL ARCHITECTURE. The Unified Capabilities Requirements (UCR) DISN architecture in Figure 2-1 depicts the relationship of the SUT to the DISN switches.
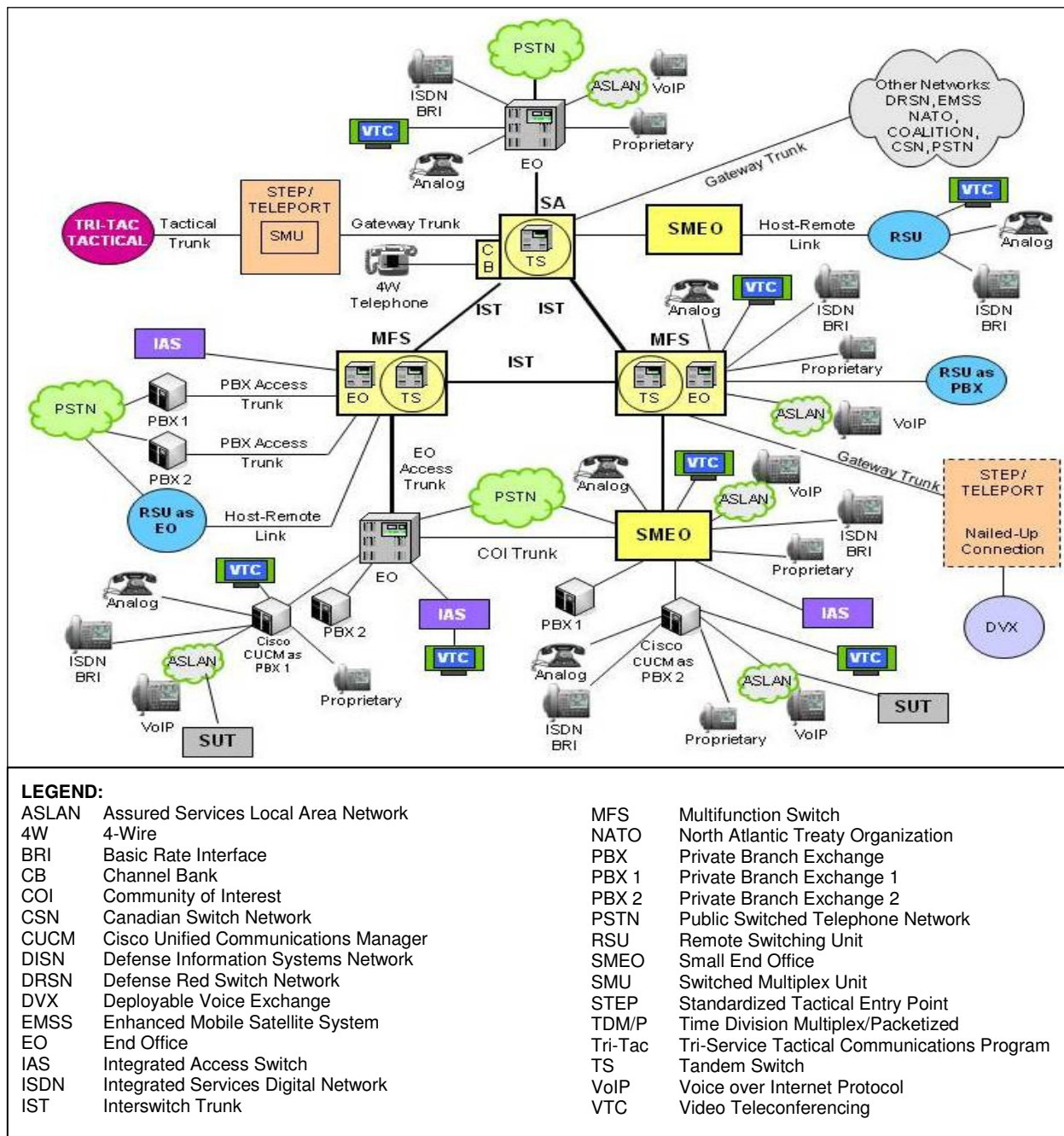
LEGEND:

ASLAN	Assured Services Local Area Network		MFS	Multifunction Switch
4W	4-Wire		NATO	North Atlantic Treaty Organization
BRI	Basic Rate Interface		PBX	Private Branch Exchange
CB	Channel Bank		PBX 1	Private Branch Exchange 1
COI	Community of Interest		PBX 2	Private Branch Exchange 2
CSN	Canadian Switch Network		PSTN	Public Switched Telephone Network
CUCM	Cisco Unified Communications Manager		RSU	Remote Switching Unit
DISN	Defense Information Systems Network		SMEO	Small End Office
DRSN	Defense Red Switch Network		SMU	Switched Multiplex Unit
DVX	Deployable Voice Exchange		STEP	Standardized Tactical Entry Point
EMSS	Enhanced Mobile Satellite System		TDM/P	Time Division Multiplex/Packetized
EO	End Office		Tri-Tac	Tri-Service Tactical Communications Program
IAS	Integrated Access Switch		TS	Tandem Switch
ISDN	Integrated Services Digital Network		VoIP	Voice over Internet Protocol
IST	Interswitch Trunk		VTC	Video Teleconferencing

Figure 2-1. DISN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to the SUT and interoperability results are listed in Table 2-1. These requirements are derived from the UCR Interface, Capability Requirements (CR), and Functional Requirements (FR) and were verified through JITC testing. The specific SUT applications certified on each interface are depicted in Table 2-1.

Table 2-1. SUT CRs and FRs and Interoperability Status

Interface	Critical	Certified	CRs/FRs	Met	UCR Paragraph
EIA-232 Serial	No	Yes	ANSI/TIA/EIA-232-F (C)	Met	5.2.1.2
			FCC Part15/Part 68 (R)	Met	5.2.1.2
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			IEEE 802.3 (C)	Met	5.2.1.2
Security	Yes	Yes	Security (R)	Met See note.	5.4

NOTE: Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

LEGEND:

1000BaseT	1000 Mbps (Baseband Operation, Twisted Pair) Ethernet	FR	Functional Requirement
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	GR	Generic Requirement
		GR-506	LSSGR: Signaling for Analog Interfaces
ANSI	American National Standards Institute	IAW	In accordance with
C	Conditional	IEEE	Institute of Electrical and Electronics Engineers
CR	Capability Requirement	IP	Internet Protocol
DCE	Data Circuit-terminating Equipment	LATA	Local Access and Transport Area
DISA	Defense Information Systems Agency	LSSGR	LATA Switching Systems Generic Requirements
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DTE	Data Terminal Equipment	Mbps	Megabits per second
DTMF	Dual Tone Multi-Frequency	R	Required
EIA	Electronic Industries Alliance	SUT	System Under Test
EIA-232-F	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	TIA	Telecommunications Industry Association
		TIA/EIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
FCC	Federal Communications Commission	UCR	Unified Capabilities Requirements

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility, Fort Huachuca, Arizona in a manner and configuration similar to that of the DISN operational environment. Testing the system's required functions and features was conducted using the test configurations depicted in Figure 2-2.
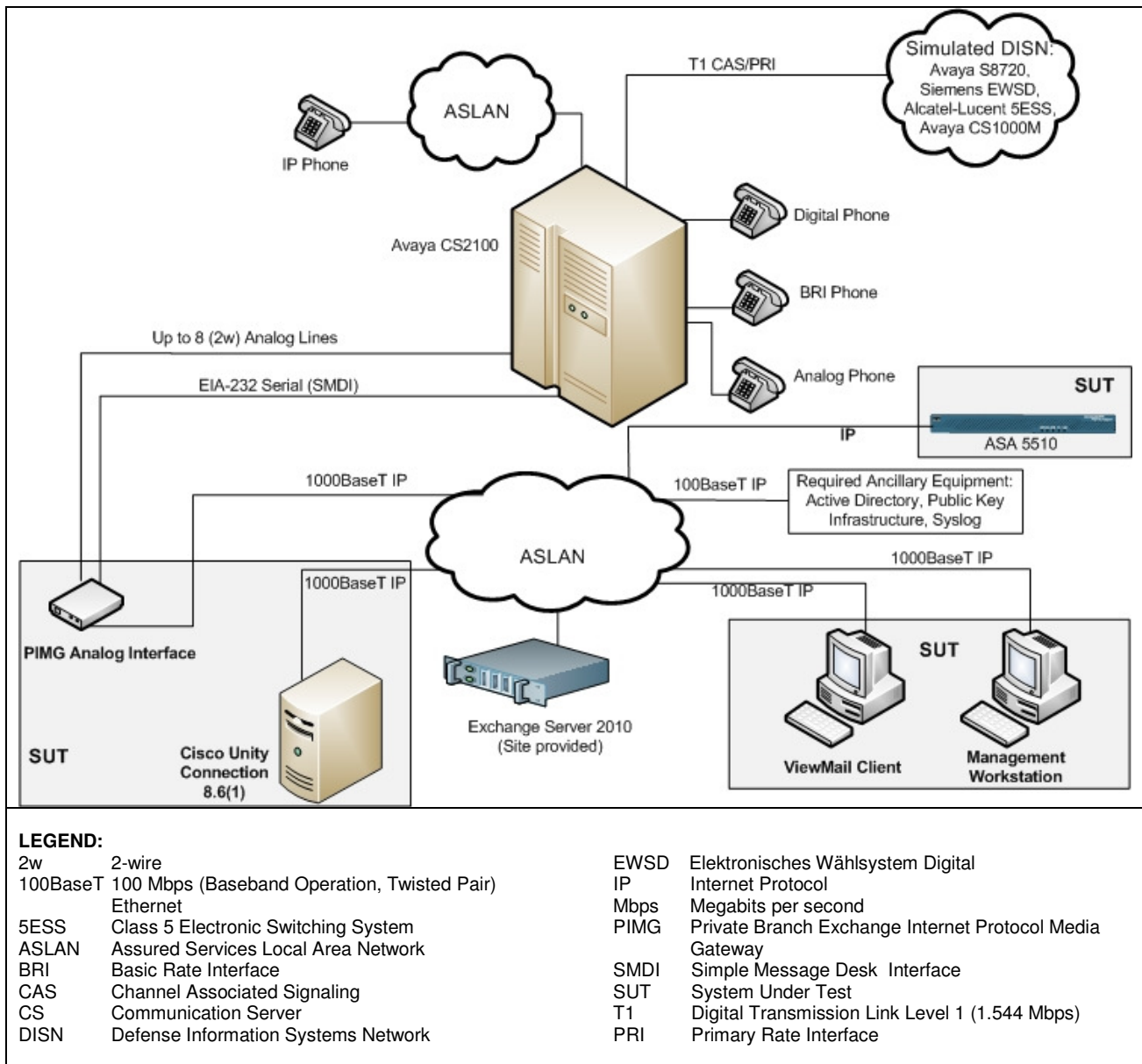
Figure 2-2. SUT Test Configuration

LEGEND:

2w	2-wire	EWSD	Elektronisches Wählsystem Digital
100BaseT	100 Mbps (Baseband Operation, Twisted Pair) Ethernet	IP	Internet Protocol
		Mbps	Megabits per second
5ESS	Class 5 Electronic Switching System	PIMG	Private Branch Exchange Internet Protocol Media
ASLAN	Assured Services Local Area Network		Gateway
BRI	Basic Rate Interface	SMDI	Simple Message Desk Interface
CAS	Channel Associated Signaling	SUT	System Under Test
CS	Communication Server	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DISN	Defense Information Systems Network	PRI	Primary Rate Interface

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DISN switches noted in Table 2-2. The DISN switches listed in Table 2-2 only depict the tested configuration. Table 2-2 is not intended to identify the only switch software releases that are certified with the SUT. The SUT is certified specifically with switching systems listed on the Unified Capabilities (UC) Approved Product List (APL) that are certified for voicemail with the serial Electronic Industries Alliance (EIA)-232 Simple Message Desk Interface (SMDI) and 2-wire loop start analog interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release	
Avaya S8720	CM 4.0 (R014x.00.2.731.7: Super Patch 14419)	
Nokia Siemens EWSD	19d with Patch Set 46	
Avaya CS2100	SE 09.1	
Alcatel-Lucent 5ESS	5E16.2 BWM 09-0002	
Avaya CS1000M	5.0	
Required Ancillary Equipment	Active Directory	
	Public Key Infrastructure	
	SysLog	
Site-provided	Exchange Server 2010 version 14.01.0289.001	
Alcatel-Lucent Simple Message System Interface ED5D885-30, G40	Release 2.0 (Provides the SMDI interface)	
SUT	**Hardware**	**Software/Firmware**
Cisco Unity Connection Software Release 8.6(1) with Private Branch Exchange (PBX) Internet Protocol Media Gateway (PIMG) Analog Interface (SUT)	Unified Computing System C210-M1[1]	Cisco Unity Connection Software Release 8.6.1.20004-1
	PIMG	6.0SU7.004
	ASA 5510[2]	ASA 8.4.3
	Management Workstation (Site-provided) STIG-compliant, CAC-enabled	Windows XP SP3 Windows Vista SP2 Windows 7 SP1
	Client Workstation (Site-provided)	Windows XP SP3 Windows Vista SP2 Windows 7 SP1
		MS Outlook 2010
		View Mail 8.5
Telephone Types Tested with the SUT	**Hardware**	**Software/Firmware**
Analog	Panasonic KX-TS15-W (Analog)	Not Applicable
	Panasonic KX-T2355 (Analog)	Not Applicable
ISDN BRI	Avaya M5317T	Not Applicable
Digital	M5008	Not Applicable

NOTES:
1. Supported hardware configurations can be found by selecting the Cisco Unified Communications on the Cisco Unified Computing System link at the following URL: www.cisco.com/go/swonly.
2. The ASA 5510 was tested; however, the following ASA products employ the same software and similar hardware as the ASA 5510. JITC analysis determined these systems to be functionally identical to the ASA 5510for interoperability certification purposes and therefore, they are also certified for joint use with the SUT: 5505, 5520, 5540, 5550, 5585-SSP10, 5585-SSP20, 5585-SSP30, and 5585-SSP40.

Table 2-2. Tested System Configurations (continued)

10. TEST LIMITATIONS. None.

11. TEST RESULTS

    a. Discussion

        (1) Voice mail interaction with Multi-Level Precedence and Preemption (MLPP). The UCR 2008, Change 2, paragraph 5.2.1.2, states that Customer Premise Equipment must meet MLPP requirements in accordance with (IAW) paragraph 5.3.2.31.3. The SUT was tested IAW the UCR 2008, Change 2, Section 5.2.1.2, which states that precedence levels above ROUTINE shall not be forwarded to voice mail. The SUT was tested to ensure that it properly interacted with MLPP. Intra-switch and inter-switch calls at different precedence levels were placed over the test network test to subscribers configured with voicemail on the SUT with the following results:

           (a) All ROUTINE calls placed to a voice mail subscriber that was busy or did not answer, were properly routed to voice mail.

           (b) All calls above ROUTINE placed to a voice mail subscriber that was busy or did not answer were not routed to voice mail, but instead were diverted to the global default diversion route.

        (2) Differentiated Services Code Point (DSCP). The UCR 2008, Change 2, paragraph 5.3.3.3.2, states that the product shall support the plain text DSCP plan, as shown in Table 5.3.3-1, DSCP Assignments, and the DSCP assignment shall be software configurable for the full range (0-63) to support Deployable deployments that may use a different DSCP plan.

           (a) DSCP tagging. Captures were taken between the SUT PIMG Analog and the Unity Connection. Voice media was sent as International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) G.711 packets to and from the PIMG Analog. All ITU-T G.711 packets were 20 milliseconds in duration and were correctly tagged with a DSCP value of 46. Voice signaling packets from the PIMG Analog device were properly tagged with a DSCP value of 40. The PIMG Analog device can assign any value (0-63) for both signaling and voice packets. The SUT

provides the ability to deliver voicemail messages via a .wav attachment using the Internet Message Access Protocol (IMAP) protocol to a user running Microsoft Outlook. The user can then play, delete, and otherwise manipulate the voicemail directly using the Cisco ViewMail Outlook Plugin. The SUT is also capable of synchronizing messages with a user's Microsoft Exchange mailbox so that messages stored on Unity Connection will appear in the user's inbox. This functionality was tested and the IMAP packets transmitted by the SUT to the PC client were correctly tagged with a DSCP value of 0. The Management Workstation has the ability to assign any value (0-63) and correctly tagged the DSCP value at 16 for operational network management traffic.

b. Test Summary. The SUT meets the critical interoperability requirements for a Customer Premise Equipment voice mail system IAW Reference (c). Additionally, JITC analysis also determined that any digital switching system on the UC APL that has a certified serial EIA-232 SMDI and 2-wire loop start analog interface should function identically and are also certified with the SUT. No other configurations, features, or functions, except those cited within this report, are certified by the JITC.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed IAW the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.